UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Forest Insect and Disease Management
P.O. Box 5895, Asheville, N.C. 28813

REPLY TO: 1310-Planning

February 19, 1980
Report No. 80-1-10

SUBJECT: Trip Report - Puerto Rico, January 13-19, 1980

TO: Harold W. Flake, Field Representative
FIDM

On January 13, 1980, we arrived in Puerto Rico for the purpose of training the Renewable Resources Inventory personnel on identification of survey damage types. Prior to arrival, we had contacted Edwin Maldonado, Southeastern Area, State and Private Representative, to see if there were other entomology or pathology problems that they wanted to look at while in the area. Edwin contacted U.S.F.S. and Puerto Rican government personnel to see if we could be of service. He also made local motel and transportation arrangements.

On January 14, we met Edwin Maldonado at the Supervisor's Office, Caribbean National Forest, and discussed the agenda. We then met with Thomas Schubert, Research Forester, Southern Forest Experiment Station. Dr. Schubert discussed three areas of concern listed below:

1. The need for identification of insect and disease problems on urban trees (very little information is available). Tom feels there is a need for S&PF to make a survey of urban tree pests and determine the significance of each pest by tree species.

2. Lack of information on registered pesticides for controlling forest and urban tree pests. Tom was told he could send samples for identification and requests for registered pesticides and control recommendations to Forest Insect and Disease Management, Asheville Field Office.

3. Continuity of FIDM personnel and effort to solve some of the problems. In the past, new personnel normally arrived on each trip and were unfamiliar with tree species and/or associated pests. Due to this, very little followup occurred after each visit.

In the afternoon training was given to the Renewable Resources Inventory personnel. Training was provided on 19 different damage types. The damage types and descriptions follow:

Code	Insect or disease	Common host species	Symptoms
00	No damage	All species	No symptoms
10	Insects except hardwood borers & bark beetles	All species	Defoliation and frass droppings. In hardwoods, leaves are often skeletonized before total consumption. In conifers, early damage often appears as a curling and drying of needles. With older damage, needles appear "clipped" near sheaths.
11	Hardwood borers	All hardwoods	Initial symptoms consist of a bark insect spot on the bark surface (often mixed with frass). Eventually, coarse boring particles appear in bark cracks and crevices beneath attack point. Old damage appears as knobby overgrowths.
12	Bark beetles	All species (especially pines)	In pines, appearance of cream to yellow and pinkish globs of resin on bark surface which resemble popped popcorn or bubblegum. If infection is well established and some trees still retain their foliage, tunnels or egg galleries are evident on inner bark surface and on surface of sapwood. Streaks of bluestain fungus also evident on sapwood. Foliage gradually yellows then redens. In hardwoods, fine frass often evident on bark surface with most pest species. Sub-bark symptoms similar to those with pine sapwood usually deeply etched by egg galleries.

Code	Insect or disease	Common host species	Symptoms
13	Terminal, shoot & stem borers	All species	These pests will cause terminal and branch die-back due to larval tunnels in the main terminal and some branches. Fresh attacks will show boring dust and frass at the entrance holes, most often at leaf petioles and buds.
14	Sucking insects (scale & aphids)	All species	Scale usually appears on the leaves, buds, twigs and main stems of trees. Aphids are also found in same areas. Damage is usually wilting, bending or dying of the plant tissue affected. Another important identifying characteristic of this pest is the presence of "sooty mold", caused by the fungus (Capnodium sp.), which is usually a black mold. This mold grows on the honeydew excreted by the scale or aphids.
20	Other diseases	All species	Damage due to diseases not coded 21-29. For example, eastern gall rust, brown spot, and red heart on pines.
22	Root rots	All species	Diseased trees frequently occur in groups (centers) which contain dead or wind-thrown trees; diseased trees may have thin, tufted crowns or may turn completely brown. In a short time roots of wind-thrown trees are decayed. Annual or perennial fruiting bodies may be present on the roots or at the base of

Code	Insect or disease	Common host species	Symptoms
22 cont.			affected trees. In some cases, the trees may break in the butt section revealing extensive decay. Disease is more frequent in trees of reduced vigor or following butt or root injury; frequently precedes bark beetles.
25	Cankers	All species	Dead sunken area on stem, frequently showing annual callus ridges.
26	Branch stubs	All species	Branch holes or stubs greater than 4" in diameter on stem (trees 5.0 inches d.b.h. and larger). Branch holes or stubs greater than 1" in diameter on stem (trees 1.0 - 4.9 inches d.b.h.).
28	Other basal defects	All species	Butt rot due to causes other than fire or logging damage (root rot, parent stump, frost seam, low stubs, butt bulge). Cause of cull is below d.b.h.
30	Fire	All species	Fire scar usually at base of stem; widespread in stand; usually on uphill side of slope; charring on reburned stems.
41	Animal	All species	Rodent
50	Weather	All species	Windthrow, lightning strikes, etc.
60	Suppression and stagnation	All species	Overtopped trees with poor form.

Code	Insect or disease	Common host species	Symptoms
61	Dieback	All species	Tips on the branches dieback. Just a few branches are affected at first with whole branches dying in advanced stages. Tree mortality may result. Frequently associated with stressed trees.
62	Top breakage	All species	Broken stem greater than 4" in diameter (trees 5.0 inches d.b.h. and larger). Broken stem of any diameter (trees 1.0 - 4.9 inches d.b.h.).
63	Form (damaging)	All species	Deformed due to unknown causes.
73	People	All species	All people damage; except that related to logging.
81	Logging and related	All species	Logging scar on stem; callus ridges with 1-2 years after wounding; scattered in stand; no charring; limb breakage and/or stem scar near crown resulting from tree felling. Look for skid trails, stumps, etc.

Field notebooks providing pictures and descriptions of each damage type were provided to each field crew. Notebooks and color slides were used for training.

Later we met with Roy Beltz, Project Leader, Renewable Resources Inventory, Southern Forest Experiment Station, and discussed the Puerto Rican and Tennessee surveys. Roy will provide us with an example study plan and we will prepare cooperative study plans to cover the two surveys. In addition, a new approach for Alabama, using models, was discussed. This will be coordinated with the Gulfport research unit by Roy. We will coordinate proposed changes with the Alexandria Field Office.

On Tuesday the 15th, we met with Pepe, Forest Technician, Caribbean National Forest, to discuss insect and disease problems on the Caribbean National Forest. Pepe introduced us to Monti Maldonado, Timber Technician, Caribbean National Forest, who took us to the Catalina mahogany nursery. They produce about 50,000 mahogany seedlings per year (bigleaf and Swietenia). Both species were affected by the mahogany shoot borer and sugar cane root stalk borer weevil. The weevil was feeding on the roots in the larval stage and the foliage in the adult stage. Major damage was only caused by the larvae. This is the first report of the pest in this nursery. We agreed to check registered pesticides and control procedures for these pests. Another problem we looked at was thrips on Kadam. It was causing premature leaf fall but had little impact on the tree. We examined a planting of bigleaf and Swietenia mahogani under an overstory of Kadam and eucalyptus. Mahogany shoot borer damage in this planting was very low.

On Wednesday the 16th, we spent the day with the Renewable Resources Inventory crew in the field. Richard Birdsey, who is in charge of the Puerto Rico survey, was our primary contact. The crews put in two practice plots. We were able to provide input into the damage section and observed how the plots are put in. We saw basal defects and top breakage on Monocoda bidenta, mechanical injury on Tabonuco sp, cankers on Guarea guidonia, borer attacks on Ingarea sp. and root rot and dieback on a variety of species.

Two categories were added:

Code	Insect or disease	Common host species	Symptoms
70	Vines and parasitic plants	All species	Code only if damaging trees.
72	Other damage	All species	Damage not caused by any other damage type.

Form damage was also further defined as enough damage to cause cull or totally eliminate bd. ft. volume.

The crews were also provided with a set of logics for making decisions on which code to record. The logic list is as follows:

1. If a damage will cause death of a tree, code it first.

2. In the absence of 1, record the damage that will cause the most degrade.

3. In the absence of 1 or 2, record the damage that will cause the most growth loss.

4. In the absence of 1, 2 or 3, record the most common damage type.

A heart rot (identification pending) was found in Cyrilla racemiflora. This is the primary nesting site of La Higuaca, Puerto Rico's endangered parrot. This seems to be the primary site because of the cavities caused by this fungus. It is somewhat academic but the beneficial relationship of the heart rot fungus should be thoroughly investigated to understand its relationship to the parrot. Perhaps the fungus could be used to create proper cavities. The conk was collected and shipped to the Forest Products Laboratory for identification. A pamphlet on the parrot is enclosed.

On the morning of January 17, we met Edwin Maldonado at the Monterrey Commonwealth Nursery. Edwin introduced us to Miguel Ayala Betancourt, Nursery Superintendent and Benedicto Aviles Sanchez, Assistant Superintendent. We then examined the Caribbean pine and the bigleaf mahogany. The Caribbean pine had no apparent problems as compared to the previous survey, where cylindrocladium was found. The nursery manager told us that they had changed the soil collection area, which seems to have solved the problem. The bigleaf mahogany was infested with the mahogany shoot borer (Fig. 16) and the "sugarcane root-stalk borer weevil" or "vaquita". The weevil was feeding on the foliage, with no aboveground symptoms caused by root feeding. We then went with Senor Sanchez to the Combalachee Commonwealth Nursery. We met Louis A. Somot, Nursery Superintendent. The first problem we observed was a defoliator on mahoe and manjack. The insect was collected and will be identified later. The next problem was a leaf disease on mahoe resembling powdery mildew. Identification will be made later. We then observed a leaf skeletonizer on anacaguita. The insect was not present for identification. Another leaf skeletonizer was found on higuera. The insect was collected and identification will be made later. A dieback was observed on roble blanco. The fungus was fruiting on dead twigs and identification should be relatively easy. A leaf spot was found on Burbon coffee trees. This leaf spot occurs at the Monterrey Nursery and is controlled by lime sulfur sprays. Control by sanitation pruning was discussed. Thrips feeding was observed on santa-maria. The insects were not present for identification.

The Guilta Nursery is in a colder climate and is experiencing germination problems with mahogany. We recommended that heating coils or tapes be placed in the germination beds. They requested we schedule a visit to this nursery on our next trip.

A listing of host, with pest and associated damage is provided with pictures, when available.

Specific identification and control recommendations will be provided to the land managers through Jaun E. Munoz, Forest Supervisor, Caribbean National Forest and Jose Zambrana, Forestry Department of National Resources, Commonwealth of Puerto Rico.

This concludes our January 1980 trip report. We recommend that a revisit by an entomologist and pathologist be made within one year (not during January or February, since these are very busy months for the Commonwealth).

We would like to thank Edwin Maldonado for making trip, motel and transportation arrangements.

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Supervisory Plant Pathologist

PATRICK J. BARRY
Supervisory Entomologist

Encl.

cc: Edwin Maldonado
Tom Schubert
Frank Wadsworth
Harvey Toko
Roy Beltz
Joe McClure
Juan E. Munoz, Supervisor, Caribbean NF
Jose Zambrana

Plant	Location	Pest	Damage
Rubber tree *Ficus elastica*	San Juan	Necrotic leaf blotches caused by *Botryodiplodia sp.*	Frequent occurrence may be associated with salt damage affecting the appearance of the tree only (Fig. 1).
Sea Grape *Coccoloba unifera*	San Juan	Salt damage	Almost all plants observed were affected trees. disfigured with some mortality (Fig. 2).
Coconut Palm *Cocos nucifera*	San Juan to Caribbean NF	Coconut leaf scale *Aspidiotus destructor*	Observed on most of the trees in the area. Caused minor damage to leaves (Fig. 3).
Bigleaf mahogany *Swietenia macrophylla* *Swietenia mahogany* *Swietenia mahogoni*	Catalina Nursery, Caribbean NF, Monterrey Commonwealth Nursery, Combalachee	Sugarcane root stalk borer weevil, *Diaprepes abbreviatus*	Partial defoliation by adult and root feeding by larval stage. Estimated at 20% infested larval mining into the main terminal 2-4" down the shoot. This causes death of the shoot and results in crooking (Figs. 5 & 6).
Kadam *Anthocephalus cadamba*	Caribbean NF	Thrips *Selenothrips rubrocinctus*	Causes splotches on leaf surface and premature defoliation (Fig. 7).
Cyrilla racemiflora	Caribbean NF	Heart rot (Identification pending)	Causes extensive heart rot - is widespread (Fig. 8).
Monocoda bidenta	Caribbean NF	Basal decay & top breakage (fungus unknown)	Caused extensive heart rot - rare.
Tabonuco sp.	Caribbean NF	Mechanical damage	Extensive sap flow, not common.
Guarea guidonia	Caribbean NF	Canker (cause unknown but like *Diaporthe sp.*)	Found on one 5-inch tree.

Plant	Location	Pest	Damage
Ingarea sp.	Caribbean NF	Borer attack	Entrance hole with horizontal scar and exit hole. Found on one tree.
Yellow flamboyant	Rio Piedras	Dieback appears to be caused Camarosporium sp.	Dieback (Fig. 9).
Pheltophorum inerme			
Flamboyant	Eastern Puerto Rico	Dieback (cause unknown)	Dieback with some mortality.
Delonix regia			
Cassia javonica	Rio Piedras	Dieback appears to be caused by Rhizoctonia sp.	Dieback
Mahoe	Combalachee Commonwealth Nursery	Lepidopterous insect, leaf skeletonizer and leaf disease. (Disease appears to be a new disease).	30% defoliation on trees in nursery beds, 5% of trees with leaf disease. (Figs. 10 and 11).
Hibiscus elatus			
Manjack	Combalachee Commonwealth Nursery	Lepidopterous insect, leaf	20% defoliation on trees in nursery beds.
Anacaguita	Combalachee Commonwealth	This insect was not present, a skeletonizer.	30% defoliation on trees in nursery beds (Fig. 12).
Higuera	Combalachee Commonwealth Nursery	Lepidopterous, leaf	25% defoliation on trees in pots ready for sale. (Fig. 13).
Roble blanco	Combalachee Commonwealth	Disease causing dieback (appears to be caused by Botryodiplodia sp.	3% of the trees in pots ready for sale were affected (Fig. 14).

Plant	Location	Pest	Damage
Burbon Coffee	Combalachee Commonwealth Nursery & Monterrey Commonwealth Nursery	Anthracnose (Gloesporium sp.)	Necrotic leaf blotches caused by an unknown fungus.
Santa-maria (Calophyllum brasiliense Camb.)	Combalachee Commonwealth Nursery	Thrips	Causes splotches on leaf surface and premature defoliation when heavy.

Figure 1. Botryodiplodia leaf blotch of rubber tree.

Figure 2. Salt damage on sea grape.

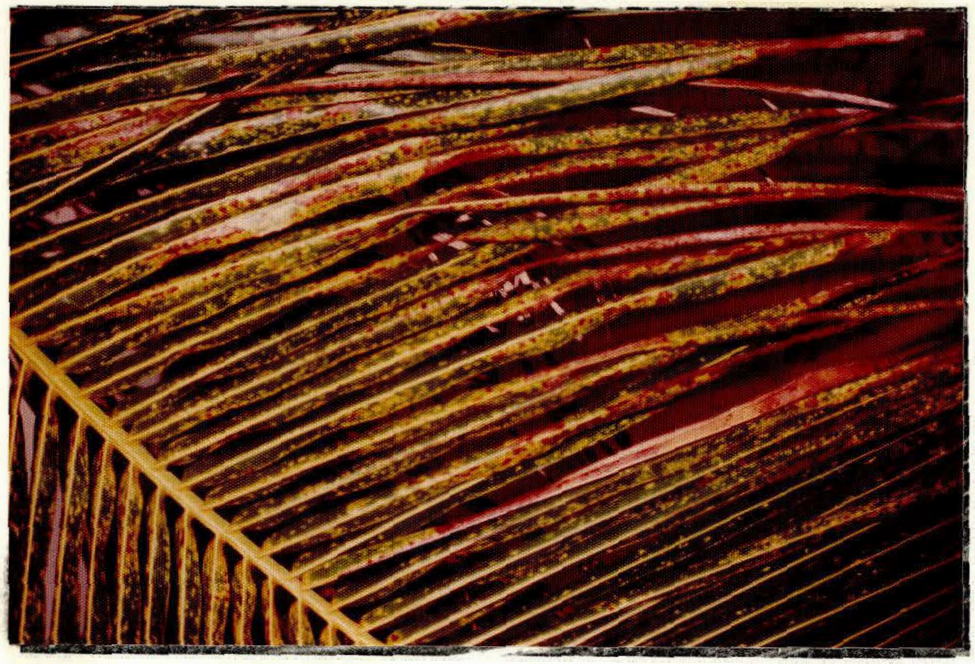

Figure 3. Coconut leaf scale on coconut palm.

Figure 4. Sugarcane root stalk borer weevil with defoliation of mahogany.

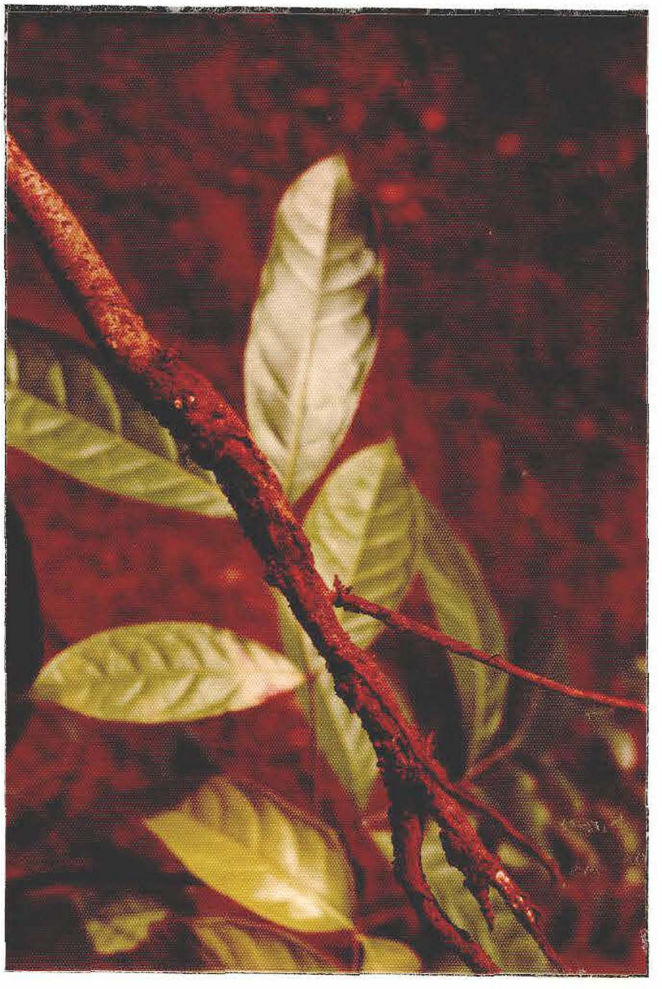

Figure 5. Old feeding scars on mahogany caused by sugarcane root stalk borer weevil.

Figure 6. New feeding on mahogany and larvae of sugarcane root stalk borer.

Figure 7. Splotches on kadam leaf caused by thrips.

Figure 8. Fruiting body of fungus causing decay in Cyrilla racemiflora.

Figure 9. Dieback on yellow flamboyant.

Figure 10. Leaf disease on mahoe.

Figure 11. Lepidopterous insect found on mahoe.

Figure 12. Damage caused by leaf skeletonizer on Anacaguita.

Figure 13. Damage caused by leaf skeletonizer on higuera.

Figure 14. Dieback on roble blanco.

Figure 15, Anthracnose on Burbon coffee.

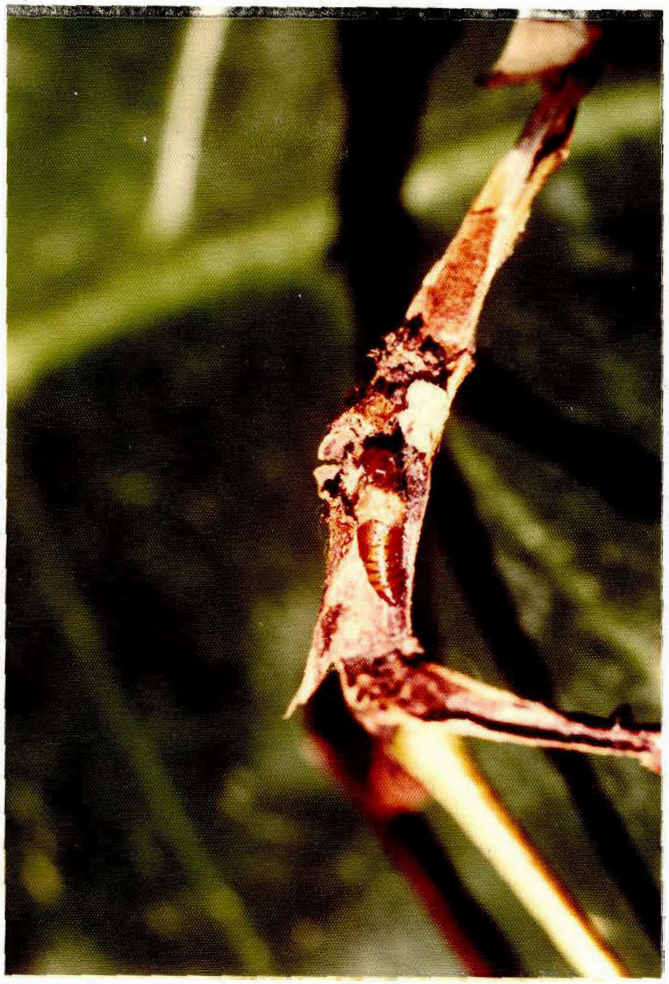

Figure 16. Pupae of the mahogany shoot borer and damage caused by the borer on mahogany.